

## ABSTRACT

A cathode with an improved work function, for use in a lithographic system, such as the SCALPEL™ system, which includes a buffer between a substrate and an emissive layer, where the buffer alters, randomizes, miniaturizes, and/or isolates the grain structure at a surface of the substrate to reduce the grain size, randomize crystal orientation and  
5 reduce the rate of crystal growth. The buffer layer may be a solid solution or a multiphase alloy. A method of making the cathode by depositing a buffer between a surface of the substrate and an emissive layer, where the deposited buffer alters, randomizes, miniaturizes, and/or isolates the grain structure at a surface of the substrate to reduce the grain size, randomize crystal orientation and reduce the rate of crystal growth.

63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1